

Gresham Committee reported that they had agreed with the Mercers' Company upon a scheme by which the open area of the Royal Exchange should be roofed over at a cost of 10,000*l*. Does this mean that the funds of the Gresham Estate are particularly flourishing just now, or that they are to be burdened with a new liability which will indefinitely postpone the time when there may be a surplus to be devoted to that advancement of science which Sir Thomas Gresham had in view in forming Gresham College? It is not long since some of the bonds, which represent money borrowed on the Gresham Estate for the building of the Royal Exchange, were advertised for repayment out of its surplus annual income, which afforded a hope that a good time for the scientific part of Sir Thomas Gresham's bequest might be drawing nigh. The public would be glad to know whether this hope is to be falsified or not. W. B.

January 20

Siwalik Carnivora

MAY I ask space to thank your correspondents for their answer to my previous inquiries concerning collections of Siwalik fossils in England, (many of which I have not yet had an opportunity of visiting,) and to add that I am now about undertaking the description of Siwalik Carnivora for the Indian Government? All remains of this order are very scarce, and in general fragmentary, and every specimen is, therefore, important. If any specimens exist in any provincial collections, I should be very glad of any information regarding them, and if possible of the opportunity of describing them in my forthcoming memoir. Any specimens sent to me, to the care of Dr. H. Woodward, F.R.S., British Museum (Natural History), Cromwell Road, S.W., will be thankfully received, and duly returned after comparison and description, if necessary. RICHARD LYDEKKER

The Lodge, Harpenden, Herts, January 17

Earthquakes

EARTHQUAKE phenomena are extremely rare in this highly favoured part of the world; but we had a very decided shock near the close of the year 1882. It occurred last night (Sunday, December 31) at about five minutes past ten o'clock, Halifax time, as nearly as can be determined at present. My observation was made at Lucyfield, ten miles north from the city of Halifax; the house stands on a rounded hill formed of unaltered drift, overlying slate rock, and at an elevation of about 350 feet above sea-level.

The air was perfectly still. There was a sudden rumble as of heavy waggons on a hard road at some little distance, then the sound became louder, I may say deafening, as of heavy loaded waggons running close to the wall; or of a heavy railway train running through a reverberating cutting; then the noise seemed overhead as if caused by rolling heavy furniture on the upper floor; there was a slight vibration of the building, as if something large and heavy had struck the roof, icicles fell from the eaves, fragments of plaster fell down behind the lathing of the walls, and there was a sound like a sudden gust of wind upon the windows and walls outside (there was no wind however). Suddenly noise and vibration ceased, and all was perfectly still. Passing outside, to look for some cause for these remarkable phenomena, nothing particular was noticeable. The country was covered with a thick white mantle of snow, the air was perfectly calm, there had been no rain drops, nor hail, but a faint flash of lightning (unaccompanied by thunder) occurred about a minute and a half or two minutes after cessation of the shock.

For two or three days prior to the shock, the temperature did not fluctuate much. The thermometer stood at zero centigrade (32° F.) at sunset on the 31st and has not varied much since; it was within a degree of the same at sunset of the previous day, but went down at night, rising again in the morning. During the day (31st) the sky was clear with some light fleecy clouds, wind northerly, but veered round to south-west about sunset, and the sky became overcast with clouds; later the clouds seemed to clear away, but the air became foggy, and was so at the time of the shock. (About Truro I am informed the sky was "clear and starry.") The air had been in a highly electric state during the afternoon and evening.

The earthquake shock lasted, as nearly as I can compute from recalling circumstances, something less than a minute, certainly more than half a minute, but probably not more than a whole one. I cannot indicate with any degree of certainty the direction

of oscillation; so far as a retrospect of circumstances and sensations indicate, the apparent movement was from south-west to north-east.

Most persons in the city of Halifax to whom I have spoken to day observed the shock more or less distinctly, but it does not appear to have been nearly as violent in the city as in some other places. I ascertained from the conductor of the morning railway train that the shock was felt more or less severely all along the journey traversed by his train this morning, viz. from Truro to Halifax, a distance of sixty-one miles. At Shubenacadie, nearly thirty miles from my point of observation, flower-pots in the railway station house were toppled over on the window-sill and rolled upon the floor.

I have jotted down these particulars, thinking they may possibly prove of some interest if compared with the observations of others at different points.

GEORGE LAWSON

Dalhousie College, Halifax, Nova Scotia, January 1

A SHOCK of earthquake was felt in this district on Tuesday, January 16, about 5 p.m. Comparatively few persons perceived it, but to those who did it was a striking phenomenon. The following report has been handed to me by a trustworthy observer:—

"About 5 p.m. on Tuesday, January 16, I was standing in a room, leaning against the foot of an iron bedstead, and facing a window, in front of which, on a table, was a cage containing one of the small African parakeets known as love birds. The room was perfectly quiet, when this bird, which had settled itself for the night, surprised me by craning out its neck and flattening its plumage with every appearance of alarm, without any sound or movement on my part, or anything in the room which could possibly have frightened it. Immediately afterwards the iron bedstead I was leaning against, as well as the floor, trembled sufficiently to make me wonder what on earth was going on, especially as I heard no sound sufficient to account for it. The trembling ceased in a few seconds, and, while I was still wondering, returned in a greater degree than before, lasting this time about five seconds. The feeling I experienced was similar to that of standing on a bridge while a load was passing over. The second time I speedily came to the conclusion that it was caused by an earthquake."

GEORGE F. BURDER

Clifton, January 20

I SHALL feel obliged if you will put on record in your columns that an earthquake was felt at Hastings by my sister and myself in separate rooms, on Tuesday morning last, the 16th inst., at 9½ minutes past 9 a.m. The undulation were between E.S.E. and W.N.W., and lasted about 4 seconds.

R. H. TIDDEMAN

H.M. Geological Survey, 28, Jermyn Street, S.W., Jan. 20

The Sea Serpent

BELIEVING it to be desirable that every well-authenticated observation indicating the existence of large sea serpents should be permanently registered, I send you the following particulars.

About three p.m. on Sunday, September 3, 1882, a party of gentlemen and ladies were standing at the northern extremity of Llandudno pier, looking towards the open sea, when an unusual object was observed in the water near to the Little Orme's Head,



travelling rapidly westwards towards the Great Orme. It appeared to be just outside the mouth of the bay, and would therefore be about a mile distant from the observers. It was watched for about two minutes, and in that interval it traversed about half the width of the bay, and then suddenly disappeared. The bay is two miles wide, and therefore the object, whatever it was, must have travelled at the rate of thirty miles an hour. It is estimated to have been fully as long as a large steamer, say 200 feet; the rapidity of its motion was particularly remarked as being greater than that of any ordinary vessel. The colour

appeared to be black, and the motion either corkscrew like or snake-like, with vertical undulations. Three of the observers have since made sketches from memory, quite independently of the impression left on their minds, and on comparing these sketches, which slightly varied, they have agreed to sanction the accompanying outline as representing as nearly as possible the object which they saw. The party consisted of W. Barfoot, J.P. of Leicester, F. J. Marlow, solicitor, of Manchester, Mrs. Marlow, and several others. They discard the theories of birds or porpoises as not accounting for this particular phenomenon.

F. T. MOTT

Birstal Hill, Leicester, January 16

A Novel Experiment in Complementary Colours

THE old maxim of an *adjacent gray* in order to give visibility to a complementary colour seems to hold its ground. Mr. Charles T. Whitmell puts it very clearly when he alludes to "the advantage of a reduction of brightness to a level comparable with that of the existing colour."

Mr. Whitmell will find, I think, that this brightness may be still further reduced below the level of the existing colour. This may be shown by one or two remarkable experiments with light admitted through a small needle hole the one-fiftieth of an inch in diameter, made through the bottom of a half ounce pill-box painted inside with lampblack. On placing a sheet of white paper on the table at night in a room lighted with ordinary gas, and looking through the small hole with one eye, *both eyes being open*, he will see on the paper a disc of beautiful cobalt blue colour, evidently the complementary of the yellow light of the gas. On examining the sky in the same way in the morning, there will be seen, especially if the weather is dull and hazy, as it has been of late, a disc of a *primrose yellow* colour, the complementary of the blue sky, which, although invisible, is still making its impression on the sensitive retina. Later on in the day, between five and six o'clock, when the weather is murky, the disc has a well-marked *pink* colour, the atmosphere being evidently tinged with dark green. The several results I have witnessed from day to day for the last fortnight, and they have been verified by others to whom I have shown them. But when the sky is very blue and clear, there is seen, for obvious reasons, a blue disc only.

In the above experiments there is the curious anomaly of having one eye impressed with the exciting colour, the other with its complementary.

JOHN GORHAM

Bordyke Lodge, Tunbridge, January 20

The Projection of the Nasal Bones in Man and the Ape

IN my letter in the last number of NATURE (p. 266) the walls of the human nose were carelessly ascribed to the elevation of the pre-maxillary bones. This is not the case. It is only in the ape and lower animals that the ascending processes of the pre-maxillary assist in forming the external nose-case, or muzzle, above the nostrils. The frame-work of the nose in the lower types of the negro seems, therefore, in this respect, to differ more from the nose-case of the ape, than it does owing to any great development of the nasal bones.

I take this opportunity to mention that the woodcut of the embryo, which I referred to, appeared first in Quain's "Anatomy." Also, the quotation about the nasal bones of the orang, I have since found from my notes, to have been derived from Prof. Mivart's "Man and the Ape."

January 22

J. PARK HARRISON

HOVERING OF BIRDS

THIS problem, to account for the phenomenon of the motionless hovering of hawks and other birds in mid-air, was the subject of correspondence in NATURE, vol. viii. pp. 86, 324, 362; vol. ix. p. 5; vol. x. pp. 147, 262; vol. xi. p. 364. The only plausible explanation advanced (by Joseph Le Conte, vol. ix. p. 5, and previously by the present writer, vol. viii. p. 362) was that the birds take advantage of slant upward currents of wind sufficiently strong to neutralise the force of gravity. But the arguments brought forward in support of this explanation were perhaps not quite conclusive, for lack of a sufficient series of observations.

During the past six years I have noted such instances as I have chanced to witness in the course of a wandering occupation, and now offer the results as a further contribution towards the solution of the question.

I may state at once that in every case where I have seen a bird hovering, the following three conditions have obtained:—

- (1) There was a fresh wind blowing.
- (2) The bird was facing the wind.
- (3) Beneath the bird there was a steep slope of ground facing the wind.

The particular localities in which I have observed the phenomenon are the following:—

(1) 1877, *September 17*.—Driving from Aberayron to Llanrhystyd (Cardiganshire). Wind W.N.W., moderate. Cliffs facing N.W. Gulls under cliff top, below road, in poise. Hawk under hill top, above road, in perfect poise.

(2) 1877, *October 13*.—Approaching Llantrisant town (Glamorganshire) from Llantrisant Junction. Wind S.W., moderate. Hawk over S.W. slope, barely poising, partly fluttering, tail plainly brushed up.

(3) 1877, *October 14*.—Llantrisant (Glamorganshire). Wind S.S.W. Rooks upborne, above S.S.W. slopes of hill with entrenched fort (Caerau).

(4) 1877, *October 20*.—Cliff facing S. between Longland and Caswell Bays, Gower (Glamorganshire). Gull and crows upborne. Wind moderate, S.S.W.

(5) 1877, *October 21*.—Cefn Bryn, Gower (Glamorganshire), facing S.S.W., climbing from Reynoldston. Rooks upborne. Wind strong, S. by W.

(6) 1879, *October 17*.—On road from Llantrisant to Pontypridd (Glamorganshire). Wind W. Rooks upborne over slopes facing W.

(7) *October 28*.—Killay, near Swansea (Glamorganshire). Hawk poised above hill-side facing N.E., to the west of Killay railway station. Wind N.E. I was almost under the bird, and could see the conduct of wings and tail suiting the ripples of wind.

(8) 1879, *November 5*.—Near Merthyr Tydfil (Glamorganshire). Hawk poised over N. slope of hill above (to S.) of tunnel on Merthyr-Abernant Railway. Wind N.

(9) 1880, *March 13*.—Near Penally (Pembrokeshire). Sea-gulls, rooks, and jackdaws upborne and floating with wings outstretched all along cliff line facing S., between Penally and Lydstep. Wind S., full on cliff from the sea. Gulls up to 200 feet above cliff edge. At greater height and inland, they were flapping. Different behaviour of rooks over inland northern slope.

Further on, over caves at north end of Lydstep Sands, hawk poised for 1 min. and 1½ min. at a time, just over cliff line, in teeth of wind off sea.

(10) 1880, *March 17*.—Near Cardiff (Glamorganshire). Hawk poised about 10 or 12 feet above railway embankment facing E.N.E. (20 or 25 feet high) of Llandaff and Penarth line, near Ely Station. Wind E.

(11) 1880, *March 27*.—Gulls uplifted over E. scarp of Beachy Head Down (Sussex). Wind E.N.E.

(Same day).—Over N.E. slope of Lighthouse Down. Bevy of eight gulls, all in perfect poise, immediately over edge of cliff.

(12) 1880, *August 8*.—Wells next-the-sea (Norfolk). Wind N.W. Hawks poising over W. slope of sea-wall, and over N.W. slope of sand-hills (projecting from the main line of dunes that runs east and west), and trying unsuccessfully over railway embankment which runs N.W. and S.E.

In several of the instances here recorded I was near enough to see that the bird was delicately adapting the slope and spread of its wings to the momentarily varying inclination and force of the wind. Among the sand-hillocks near Wells, on the Norfolk coast, I succeeded in approaching, under cover of ridges and long grass, within about ten yards of a hovering hawk, and saw the